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EXAMINER

BLUM, DAVID S

ART UNIT PAPER NUMBER

2813

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,056

Applicant(s)

NAM ET AL.

Examiner

David S. Blum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13,63,78,95-109 and 111-136 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13,63,78,95-109 and 111-136 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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This action is in response to the amendment filed 12/01/05.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. With the amendment of 12/01/06, all previous 35 USC 112 rejections have been removed.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 5, 8, 12-13, 95-100, 102-103, and 106 are rejected under 35 U.S.C. 102(b) as being anticipated by Lim (JP 2001-160557 with US 006570253 used as an equivalent translation).

Lim teaches all of the positive steps of claims 1-3, 5, 8, 12-13, 95-100, 102-103, and 106 as follows.

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Regarding claim 1, Lim forms a first electrode (840), forms a dielectric layer (130, part of 100) on the electrode with a first portion of the dielectric oxide having a first density of titanium and the second portion of the oxide having a second density of titanium that is different from the first (column 2 lines 25-33), and forms a second electrode (850) so that the oxide layer is between the electrodes.

Regarding claim 2, the dielectric layer further includes tantalum (column 9 lines 28-40, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of titanium oxide and tantalum oxide.

Regarding claim 3, the dielectric layer further includes tantalum (column 9 lines 28-40, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of tantalum titanium oxide.

Regarding claim 5, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the first portion.

Regarding claim 8, where the upper layer is titanium oxide and the lower layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the second portion.

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Regarding claim 12, the lower layer may be silicon nitride (column 9 lines 28-40), which according to the instant specification, is a reaction suppressing layer.

Regarding claim 13, the lower layer may be silicon nitride (column 9 lines 28-40).

Regarding claim 95, Lim forms a dielectric layer (130, part of 100) with a first portion of the dielectric oxide having a first density of titanium and the second portion of the oxide having a second density of titanium that is different from the first (column 2 lines 25-33).

Regarding claim 96, the dielectric layer further includes tantalum (column 9 lines 28-40, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of titanium oxide and tantalum oxide.

Regarding claim 97, the dielectric layer further includes tantalum (column 9 lines 28-40, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of tantalum titanium oxide.

Regarding claim 102, Lim forms a first electrode (840), forms a nitride layer (column 9 lines 28-40) which according to the instant specification acts as a reaction suppressing layer, forms a dielectric layer (130, part of 100) on the electrode with a first portion of the dielectric oxide having a first density of titanium and the second portion of the oxide opposite the reaction suppressing layer) having a second density of titanium that is

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different from the first (column 2 lines 25-33), and forms a second electrode (850) so that the oxide layer is between the electrodes.

Regarding claim 98, the lower layer (reaction suppressing layer) may be silicon nitride (column 9 lines 28-40).

Regarding claim 99, the dielectric layer further includes tantalum (column 9 lines 28-40, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of titanium oxide and tantalum oxide.

Regarding claim 100, the dielectric layer further includes tantalum (column 9 lines 28-40, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of tantalum titanium oxide.

Regarding claim 103, where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the first portion.

Regarding claim 106, where the upper layer is titanium oxide and the lower layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the second portion.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 6-7, 9-10, 63, 78, 104-105, 107-108, 111-118, 120-123, 125-132, and 134-136 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih (US006640403) in view of Lim (JP 2001-160557 with US 006570253 used as an equivalent translation).

Shih teaches all of the positive steps of claim 4, and claims 6-7 (incorporating the limitations of claim 5 above as per Lim), and claims 9-10 (incorporating the limitations of claim 8 above as per Lim), and claims 104-105 (incorporating the limitations of claim 103 above as per Lim) and claims 107-108 (incorporating the limitations of claim 106 above as per Lim), 63, 78, 111-118, 120-123, 125-132, and 134-136, except for the titanium density of the layer in different portions.

Regarding claim 4, Shih forms a lower electrode (conductive layer 110), a reaction suppressing layer (112) on the lower electrode, a tantalum titanium oxide layer (114) on the upper layer of the reaction suppressing layer, and forms an upper electrode (116) on the tantalum titanium layer. Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41) as in the claim. Shih is silent as to varying the density of titanium between two portions. Lim forms a first electrode (840), forms a

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dielectric layer (130, part of 100) on the electrode with a first portion of the dielectric oxide having a first density of titanium and the second portion of the oxide having a second density of titanium that is different from the first (column 2 lines 25-33), and forms a second electrode (850) so that the oxide layer is between the electrodes. Lim teaches that the varying of the composition mitigates the difference between the interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4).

Regarding claim 6, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41).

Regarding claim 7, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41). Varying the density (as per Lim) to 3% would be one of mere optimization.

These ranges are considered to involve routine optimization while it has been held to be within the level of ordinary skill in the art. As noted in *In re Aller* (105 USPQ233), the selection of reaction parameters such as temperature and concentration would have been obvious:

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art. Such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

In re Aller 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ

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314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

One skilled in the requisite art at the time of the invention would have used any ranges or exact figures suitable to the method in the process of regarding concentrations (density of constituent), temperature and pressure using prior knowledge, experimentation, and observation with the apparatus used in order to optimize the process and produce the film desired to the parameters desired.

Regarding claim 9, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41).

Regarding claim 10, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41).

Regarding claim 63, Shih forms a lower electrode (conductive layer 110), a reaction suppressing layer (112) on the lower electrode, a tantalum titanium oxide layer (114) on the upper layer of the reaction suppressing layer, applies a thermal process on the tantalum titanium layer (column 3 line 51-53), and forms an upper electrode (116) on the tantalum titanium layer. Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41) as in the claim. regarding the limitation where the density of titanium varies within the layer, Lim forms a first electrode (840), forms a dielectric layer (130, part of 100) on the electrode with a first portion of the dielectric

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oxide having a first density of titanium and the second portion of the oxide having a second density of titanium that is different from the first (column 2 lines 25-33), and forms a second electrode (850) so that the oxide layer is between the electrodes. Lim teaches that the varying of the composition mitigates the difference between the interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4).

Regarding claim 123, the dielectric layer is formed at an elevated temperature and with oxygen (to form an oxide), thus a thermal process under an oxygen atmosphere.

Regarding claim 78, Shih forms a lower electrode (conductive layer 110), a reaction suppressing layer (112) on the lower electrode, a tantalum titanium oxide layer (114) on the upper layer of the reaction suppressing layer, applies a thermal process on the tantalum titanium layer (column 3 line 51-53), and forms an upper electrode (116) on the tantalum titanium layer. Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41) as in the claim. regarding the limitation where the density of titanium varies within the layer, Lim forms a first electrode (840), forms a dielectric layer (130, part of 100) on the electrode with a first portion of the dielectric oxide having a first density of titanium and the second portion of the oxide having a second density of titanium that is different from the first (column 2 lines 25-33), and forms a second electrode (850) so that the oxide layer is between the electrodes. Lim teaches that the varying of the composition mitigates the difference between the

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interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4).

The dielectric layer further includes tantalum (column 9 lines 28-40, and where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of tantalum titanium oxide and where the upper layer is titanium oxide and the lower layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the second portion.

Regarding claim 125, the density of the second tantalum titanium film is 5-15 percent (column 2 line 41).

Regarding claim 126 the reaction suppressing film is silicon nitride (column 2 line 39).

Regarding claim 127, the reaction suppressing layer is applied by rapid thermal nitridation (column 2 line 47).

Regarding claim 128, the reaction suppressing layer is formed by chemical vapor deposition (column 2 line 46).

Regarding claim 129, a titanium precursor, a tantalum precursor, and oxygen gas are supplied separately to a reactor and reacted to each other (column 2 lines 52-65).

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Regarding claim 130, the tantalum precursor is a metal alkoxide (alkoxy, column 2 line 58).

Regarding claim 131, the titanium precursor is $\text{Ti}(\text{C}_3\text{H}_7\text{O})_2$ equivalent to a compound such as $\text{Ti}(\text{OCH}(\text{CH}_3)_2)_4$. (column 2 lines 59-63).

Regarding claim 132, the two precursors are mixed outside the reactor (column 2 lines 62-64, mixing box) and are sent to the reactor (showerheads 50 to place gases into reactor).

Regarding claim 134, Shih teaches controlling the density of the titanium, and also teaches controlling the temperature and gas flow rate (vaporizing temperatures and decomposition temperatures are also listed) suggesting the flow rates and temperatures affect the product composition, thus controlling the density of the titanium.

Regarding claim 135, the dielectric layer is formed at 400 degrees C (column 3 line 59) and at a pressure of 1 torr (figure 4), 1 torr=1 mmHg at 0 degrees C. (claim reads 100-760mTorr at 100-700 degrees C. It is believed the "m" should be "mm").

Regarding claim 136, the tantalum and titanium precursor are provided at a rate of 5-200mg/min (figure 4 in gas flow rate (sccm) rather than (mg/min).

Regarding claim 104, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41).

Regarding claim 105, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41). Varying the density (as per Lim) to 3% would be one of mere optimization as above.

Regarding claim 107, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41).

Regarding claim 108, Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41).

Regarding claim 111, Shih forms a reaction suppressing layer (112) on the lower electrode.

Regarding claim 112 the reaction suppressing film is silicon nitride (column 2 line 39).

Regarding claim 113, the reaction suppressing layer is applied by rapid thermal nitridation (column 2 line 47).

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Regarding claim 114, the reaction suppressing layer is formed by chemical vapor deposition (column 2 line 46).

Regarding claim 115, a titanium precursor, a tantalum precursor, and oxygen gas are supplied separately to a reactor and reacted to each other (column 2 lines 52-65).

Regarding claim 116, the tantalum precursor is a metal alkoxide (alkoxy, column 2 line 58).

Regarding claim 117, the titanium precursor is $\text{Ti}(\text{C}_3\text{H}_7\text{O})_2$ equivalent to a compound such as $\text{Ti}(\text{OCH}(\text{CH}_3)_2)_4$. (column 2 lines 59-63).

Regarding claim 118, the two precursors are mixed outside the reactor (column 2 lines 62-64, mixing box) and are sent to the reactor (showerheads 50 to place gases into reactor).

Regarding claim 120, Lim teaches controlling the density by temperature and pressure (directly related to amount of flow gasses (column 5 lines 14-17)).

Regarding claim 121, Shih forms a lower electrode (conductive layer 110), a reaction suppressing layer (112) on the lower electrode, a tantalum titanium oxide layer (114) on the upper layer of the reaction suppressing layer, applies a thermal process on the

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tantalum titanium layer (column 3 line 51-53), and forms an upper electrode (116) on the tantalum titanium layer. Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41) as in the claim. Regarding the limitation as to the density of titanium depends upon the thickness of the layer, there are no limitations as to how the density of the titanium depends upon the thickness. Therefore, as Shih teaches a concentration (in the range of the instant claim) and a thickness, its titanium density depends upon the thickness of the layer. The tantalum and titanium precursors are mixed in chamber 40 and then supplied to the reactor. The dielectric layer is formed at 400 degrees C (column 3 line 59) and at a pressure of 1 torr (figure 4), 1 torr=1 mmHg at 0 degrees C. (claim reads 100-760mTorr at 100-700 degrees C. It is believed the "m" should be "mm"). Lim teaches that the varying of the composition mitigates the difference between the interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4). The dielectric layer further includes tantalum (column 9 lines 28-40, and where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of tantalum titanium oxide and where the upper layer is titanium oxide and the lower layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the second portion.

Regarding claim 122, the tantalum and titanium precursor are provided at a rate of 5-200mg/min (figure 4 in gas flow rate (sccm) rather than (mg/min).

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It would be obvious to one skilled in the requisite art at the time of the invention to modify Shih by varying the titanium density as taught by Lim to mitigate the difference between the interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4).

6. Claims 11 and 109 are rejected under 35 U.S.C. 103(a) as being unpatentable Lim (JP 2001-160557 with US 006570253 used as an equivalent translation) in view of Lee (US006339009B1).

Shih teaches all of the positive steps of claim 11 as recited above in regard to claim 1, and of claims 101 and 109 as recited above in regard to claim 102, except for the materials of which the first and second electrode are comprised and the location of the reaction suppression layer (claim 101).

Regarding claim 11, Lim is silent as to the materials of the first and second electrodes. Lee also forms dielectric layers of tantalum and titanium oxide and teaches the first electrode is polysilicon (column 2 lines 51-52) and the second is of metal, metal nitride, or metal oxide (column 4 lines 34-41).

Regarding claim 101, Lee teaches forming a nitride layer (reaction suppression layer) so that the electrode is between the substrate and the nitride layer to prevent oxidation of the electrode and the Ti/Ta oxide layers (column 2 lines 58-65).

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Regarding claim 109, Lim is silent as to the materials of the first and second electrodes. Lee also forms dielectric layers of tantalum and titanium oxide and teaches the first electrode is polysilicon (column 2 lines 51-52) and the second is of metal, metal nitride, or metal oxide (column 4 lines 34-41).

It would be obvious to one skilled in the requisite art at the time of the invention to modify Lim by placing the electrode between the substrate and the nitride layer as taught by Lee to prevent oxidation of the electrode and the Ti/Ta oxide layers (column 2 lines 58-65) and to form the electrodes of polysilicon and metal, metal nitride or metal oxide as taught by Lee to be a known practice. One skilled in the art would use a known material rather than spend research time and money to develop a new material when a working material is readily available.

7. Claims 119 and 133 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih (US006640403) in view of Lim (JP 2001-160557 with US 006570253 used as an equivalent translation) and in further view of Lee (US006339009B1).

Shih teaches all of the positive steps of claim 119, except for the titanium density of the layer in different portions and (additionally claim 133 as recited above in regard to claim 132) for the precursors used in forming the Ti/Ta layers.

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Regarding claim 119, Shih forms a lower electrode (conductive layer 110), a reaction suppressing layer (112) on the lower electrode, a tantalum titanium oxide layer (114) on the upper layer of the reaction suppressing layer, applies a thermal process on the tantalum titanium layer (column 3 line 51-53), and forms an upper electrode (116) on the tantalum titanium layer. Shih teaches the density (concentration) of titanium to be 5-15 percent (0.05-0.15 column 2 line 41) as in the claim. regarding the limitation where the density of titanium varies within the layer, Lim forms a first electrode (840), forms a dielectric layer (130, part of 100) on the electrode with a first portion of the dielectric oxide having a first density of titanium and the second portion of the oxide having a second density of titanium that is different from the first (column 2 lines 25-33), and forms a second electrode (850) so that the oxide layer is between the electrodes. Lim teaches that the varying of the composition mitigates the difference between the interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4). The dielectric layer further includes tantalum (column 9 lines 28-40, and where the lower layer is titanium oxide and the upper layer is tantalum oxide (or vice versa) the transition layer (130) will be of tantalum titanium oxide and where the upper layer is titanium oxide and the lower layer is tantalum oxide (or vice versa) the transition layer (130) will be of a greater density of titanium oxide in the second portion.

Shih and Lim teach various precursors but not the ones listed in claim 119. Lee teaches the use of various precursors, including pentethoxide tantalum (column 3 line 45) and $\text{Ti}[\text{OCH}_2(\text{CH}_3)_2]_4$ (column 3 line 50).

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Regarding claim 133, Shih and Lim teach various precursors but not the ones listed in claim 119. Lee teaches the use of various precursors, including pentethoxide tantalum (column 3 line 45) and $\text{Ti}[\text{OCH}_2(\text{CH}_3)_2]_4$ (column 3 line 50).

It would be obvious to one skilled in the requisite art at the time of the invention to modify Shih by varying the titanium density as taught by Lim to mitigate the difference between the interaction parameters of the upper and lower layers (column 3 line 66-column 4 line 4) and to use known precursors as taught by Lee to be a known practice. One skilled in the art would use a known material rather than spend research time and money to develop a new material when a working material is readily available.

Response to Arguments


8. Applicant's arguments with respect to claims 1-13, 63, 78, 95-109, 111-123, and 125-136 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Blum whose telephone number is (571)-272-1687) and e-mail address is David.blum@USPTO.gov.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached at (571)-272-1702. Our facsimile number all patent correspondence to be entered into an application is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David S. Blum

March 27, 2006